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Areas for improvement in community optometry: flashes and floaters take priority

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Abstract

Purpose: A common response to rising demand for healthcare is to extend the role of health professionals and the range of their service provision. Community optometry in Scotland is a recent example of this. Within this context of innovation and change there are challenges to ensuring quality in optometry practice. The purpose of this research is to establish what the priorities are for practice improvement within community optometry and to start a programme to inform strategies to improve practice.

Methods: A four stage study was conducted: (1) a service-driven topic prioritisation exercise to identify priorities for optometry practice improvement; (2) a review of national and international guidance and UK protocols relating to the identified priority topic; (3) a national theory-based survey identifying current practice and the barriers and facilitators to the target behaviour; and (4) the identification of theory-based intervention options to improve practice. The Behaviour Change Wheel approach to behaviour change intervention development and Theoretical Domains Framework (TDF) provided the underlying theoretical framework.

Results: Stakeholders identified 'patients presenting with flashes and floaters' as an important priority for practice improvement. The decision about whether or not to refer patients on to secondary care for further examination is the target behaviour. Guidance for optometrists on this topic is lacking. Six TDF domains were related to the decision about whether or not to refer patients with flashes and floaters to secondary care – 'social influences', 'emotion', 'beliefs about capabilities', 'beliefs about consequences', 'behavioural regulation' and 'reinforcement'.

Conclusions: This study has examined current practice in relation to the management of patients with flashes and floaters, identified the most salient targets for future strategies to improve optometry practice and highlighted what form these strategies may take. It demonstrates the use of a flexible, theory-informed approach, which can be used to engage with stakeholders and professionals to inform the design and development of efforts to improve practice in a variety of healthcare settings.

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Introduction

A common response to rising demand for healthcare is to extend the role of health professionals and the range of their service provision. Over recent years, the role of optometrists has undergone dramatic change both within Scotland (since the enactment of the NHS General Ophthalmic Services [Scotland] Regulations 2006[1]) and elsewhere.[2] Eye care has developed within community practices so that more ocular conditions can now be managed by optometrists.[3] The emphasis is now placed on the optometrists' diagnostic skills and treatment of eye conditions. In Scotland around 8% of optometrists are independent prescribers compared to 1.5% of optometrists in the rest of the UK.[4] In addition, optometrists from elsewhere in the UK must undergo additional training in order to become listed with a Scottish Health Board and provide NHS community eye care.[1]

Within this context of innovation and change are challenges to ensuring quality in optometry practice. Health services research in many healthcare settings consistently finds that one way quality may suffer is in the failure to translate evidence into practice and health services research consistently finds this to be the case.[5] As a result, many patients do not receive the highest quality healthcare services possible, the quality of care delivered does not meet healthcare practitioners' professional aspirations, and healthcare resources are allocated inefficiently with significant opportunity costs.[6] NHS Education for Scotland (NES), the national provider of postgraduate education for healthcare professionals in Scotland, is addressing these challenges and delivering measurable improvements through its programme of translational research, Translation Research in a Dental Setting (TRiaDS).[7,8] TRiaDS involves a multidisciplinary research collaboration comprising healthcare professionals, guidance developers, policymakers and international experts in implementation science research methodologies from a range of research disciplines (e.g. health economics, health psychology, health services research and healthcare organisational management). Through the development of practical, theoretically informed educational, service and policy interventions, TRiaDS aims to support Scotland's optometrists to meet the demands of their enhanced role through the delivery of high quality, clinically effective, safe and person-centred care.[9]

This paper presents the TRiaDS in Optometry study, a four-stage, theory-informed study, which engages with stakeholders and health professionals to (1) identify practice improvement priorities and (2) inform practice improvement efforts in community optometry. To the best of our knowledge, this is the first application of this type of theory-informed implementation research within community optometry and an approach that can be applied to further areas of healthcare.

Methods

Study design

The TRiaDS in Optometry study comprised four stages: (1) a topic prioritisation exercise; (2) a systematic search and review of UK local protocols and UK and international guidelines; (3) a national survey; and (4) identifying options for practice improvement interventions. *Figure 1* in the *Online Appendix* 1 maps the study design.

The first stage of the TRiaDS in Optometry study was to 'define the scope'. A topic prioritisation exercise was carried out with stakeholders (outlined in *Table* 1 below) to identify service-driven topics for practice improvement. The priority topic was then taken to the second stage to 'inform the scope' through a systematic search and review of guidance and protocols. Stage 3 was a 'diagnostic analysis' comprising a national survey to gather information from community optometrists on current practice related to the priority topic and identify the key determinants of their behaviour. The key determinants of behaviour were then mapped onto intervention options in Stage 4, utilising published matrices from the

Table 1. Prioritisation exercise process

	Stage	Criteria	Participants
I.	Topic generation	Assessing appropriateness	NHS Education for Scotland Optometry Directors and Tutors
II.	Rationalisation of topics by stakeholders	Assessing importance	Online stakeholder survey with Optometry Scotland Council & Executive Group members, Optometry Scotland general members and community optometrists
III.	Further rationalisation of topics	Assessing feasibility and potential impact	Round the table discussions with the TRiaDS Professional Advisory Group (multi-professional group including NHS Education for Scotland Optometry director and tutors and freelance optometrists) and TRiaDS Implementation Science Group (international experts in implementation research including representation from primary care, medicine, health services research, health psychology, health economics, implementation science)

Behaviour Change Wheel approach to behaviour change intervention[10] described below.

Surveys were conducted online and hosted using the survey tool Questback (www.questback.com).

Underlying theoretical framework

The Behaviour Change Wheel approach to behaviour change intervention development provided the underlying theoretical framework to the TRiaDS in Optometry study. The Behaviour Change Wheel, a synthesis of 19 frameworks of behaviour change, has at its core the COM-B model of behaviour whereby Capability, Opportunity and Motivation are essential components that interact to determine behaviour. Operationalisation of the Behaviour Change Wheel involves a number of stages including first developing a detailed understanding of the behaviour and identifying what needs to change. As per previous research applying the Behaviour Change Wheel approach,[11,12] this study used the Theoretical Domains Framework to provide this detailed understanding of behaviour. The TDF, a variant of the COM-B model, which subdivides the COM-B components, was developed, through consensus, as a theoretical framework for use in implementation research. It includes a number of behavioural theories and constructs and proposes that determinants of healthcare professionals' behaviour can be clustered into 14 theoretical 'domains'.[13] The TDF has been widely used to identify barriers and facilitators to evidence based practice, as well as to explain variation in practice.[13,14]

Topic prioritisation exercise

The first stage was to elicit service driven priorities for improving community optometry practice in Scotland. The process for selecting priority topics involved: (1) initial topic generation; (2) rationalisation of topics by key stakeholders; and (3) further rationalisation by optometry advisors and international implementation science experts. The selection and prioritisation of topics for community optometry practice in Scotland was based on four key criteria – appropriateness, relevance, feasibility, and potential impact[15–18] as presented in *Table* 1.

In order to assess appropriateness, one of the NES Optometry Programme Directors (JP) led a topic generation process by drawing up an initial list based on The College of Optometrists (2014) Code of Ethics and Guidance for Professional Conduct. This list was circulated to key stakeholders (NES Programme Directors and Programme Tutors) within the NES Optometry Directorate (the national provider for postgraduate optometrist training in Scotland) for comment and suggestions of additional and alternative topics. For each topic, the list included information on whether or not the topic was covered by the General Ophthalmic Services contract and the potential availability of routinely collected data.

These topics were rationalised via an online stakeholder survey. Council and Executive Group members of Optometry Scotland, a non-profit making organisation to develop and represent the views of the optometry sector, and community optometrists (including Optometry Scotland general members), were invited to participate in the survey to assess each of the topic headings in terms of importance as a priority topic for community optometry practice improvement in Scotland. The survey asked participants to score the topics on a 7-point Likert scale: 1 = not at all important; 7 = extremely important.

The dataset generated from the Optometry Scotland Council & Executive Group members was analysed first, followed by the data from the wider Optometry Scotland membership and community optometrists. The analysis was then re-run on the combined dataset. Potential topics and the survey results were presented to and discussed with the TRiaDS Professional Advisory Group, (a multi-professional group that includes senior optometrists, pharmacists and dentists), and the TRiaDS Implementation Science Group, a multidisciplinary collaboration of international experts in implementation research (including representation from health services research, health economics, implementation science, primary care, health psychology and medicine). Discussions focussed on the assessment of feasibility and potential impact of the four most important topics as identified from the survey results. The aim of these discussions was 'round the table' agreement on the topic(s) that should be taken forward for further study.

Systematic search and review of guidance and protocols

The second stage was a systematic search and appraisal of UK and international guidance as well as UK local protocols available to optometrists on the priority topic. The search focussed on guidance documentation that related to general optometry consultations in the community and was designed to capture both published and grey literature. Access was obtained for all relevant member only guidance. Local protocols and guidance out with the public domain were gathered through email requests to all local optometric committees in England and Wales, and to Scottish Area Optical Committees through Optometry Scotland.

All documents meeting the inclusion criteria were independently appraised using the AGREE II tool (www.agreetrust.org).[19] AGREE II is a systematic tool recognised for guidance appraisal and was developed to explore the variability and quality of clinical practice guidelines by assessing the thoroughness of the guidance development process. The tool assesses guideline validity across six key domains –

scope and purpose; stakeholder involvement; rigour of development; clarity of presentation; applicability; and editorial independence. As per AGREE II recommendations, each document was independently reviewed and rated by two randomly allocated reviewers from a team of four.

Development and execution of a national survey

The third stage was to conduct a national survey to assess current practice related to the priority topic, and the key determinants of the target behaviour.

Design and participants
All community optometrists in Scotland registered with the NES Portal[20] (the national online continuing professional development training system for NHS employees, $n = 1088$) were contacted electronically by the NES Programme Director for Optometry (JP) and invited to take part. The email invitation was sent on 21 July 2015 and contained an embedded electronic link to the questionnaire. A reminder email was sent to non-responders after 1 week and a final reminder sent after one further week. The survey was closed to responses on 20 August 2015.

Questionnaire development
To inform the development of the survey, six semi-structured qualitative telephone interviews with community optometrists were undertaken. Interviewees were purposively chosen to represent geographical spread and variation in practice size and type. The interview topic guide was developed based on the COM-B behavioural diagnosis form[21] and the TDF[13] and was designed to identify (1) the target behaviour(s) for practice improvement, and (2) the barriers and facilitators to carrying out the target behaviour (s). Interviews were conducted by HC (an experienced qualitative interviewer) and analysed using directed-content analysis[22](with the TDF as a framework) by HC and ED (a health psychologist with expertise in the TDF).

Items were constructed for each of the TDF domains identified from the qualitative data (ranging from 2 to 8 items per domain) based on the beliefs expressed by interviewees and using the participants' own language where possible. Respondents were asked to state to what extent they agreed/disagreed with the statement on a Likert Scale 1–7 (where 1 was strongly disagree and 7 was strongly agree). For some items they were asked to provide answers for both a high risk patient (e.g. the patient has had previous retinal detachment, has useful vision in one eye, or is highly myopic) and a low risk patient (e.g. symptoms for several months in both eyes, low hyperope) patient. Alongside the domain items, questions to identify current practice, demographic information and attitudes to guidance were included. In addition, five written patient scenarios designed to reflect typical patient cases were constructed to explore the target behaviour. The patient scenarios were developed with input from community optometrists to ensure reality and to include both 'high-risk' and 'low-risk' cases. Participants were asked how difficult they found the decision-making process and how confident they were with their decision.

The questionnaire was piloted by four NES Optometry tutors working in community optometry, with minor revisions made to clarify wording.

Data analysis
Summary descriptives for all sections of the questionnaire were produced. Grouped domain items were tested for internal consistency using Cronbach's alpha. Pearson correlations and linear stepwise regression models were used to examine the relationship between domains and responses to the clinical scenarios. Statistical significance was defined as p-value <0.05 and based on two sided tests. Thematic analysis was used to analyse free text responses.[23]

Identifying options for practice improvement intervention

The fourth stage utilised the published matrices from the Behaviour Change Wheel[10] and mapped the results from the national survey onto 'intervention functions' (i.e. broad categories through which an intervention can change behaviour) and then onto 'behaviour change techniques' (i.e. the active components of an intervention designed to change behaviour).

Consent and ethical review

Ethical review and approval for the study was provided by the College Ethics Review Board at the University of Aberdeen. NHS Research and Development management and approval was conducted through the NHS Research Scotland Permissions Co-ordinating Centre. The study was categorised as service evaluation and NHS Research and Development permissions were not required.

Results

Topic prioritisation exercise

Twenty-one potential topic areas were identified (see *Figure 1* below) and explored through an online survey. In the first stage of the survey, 16 of the 23 questionnaires sent to Optometry Scotland Council and Executive Group members were completed (70% response rate). Mean importance scores for all topics were calculated and the top five topics all achieved importance scores of above 5.8. The topic with the highest mean importance score was *patients who present in an emergency*.

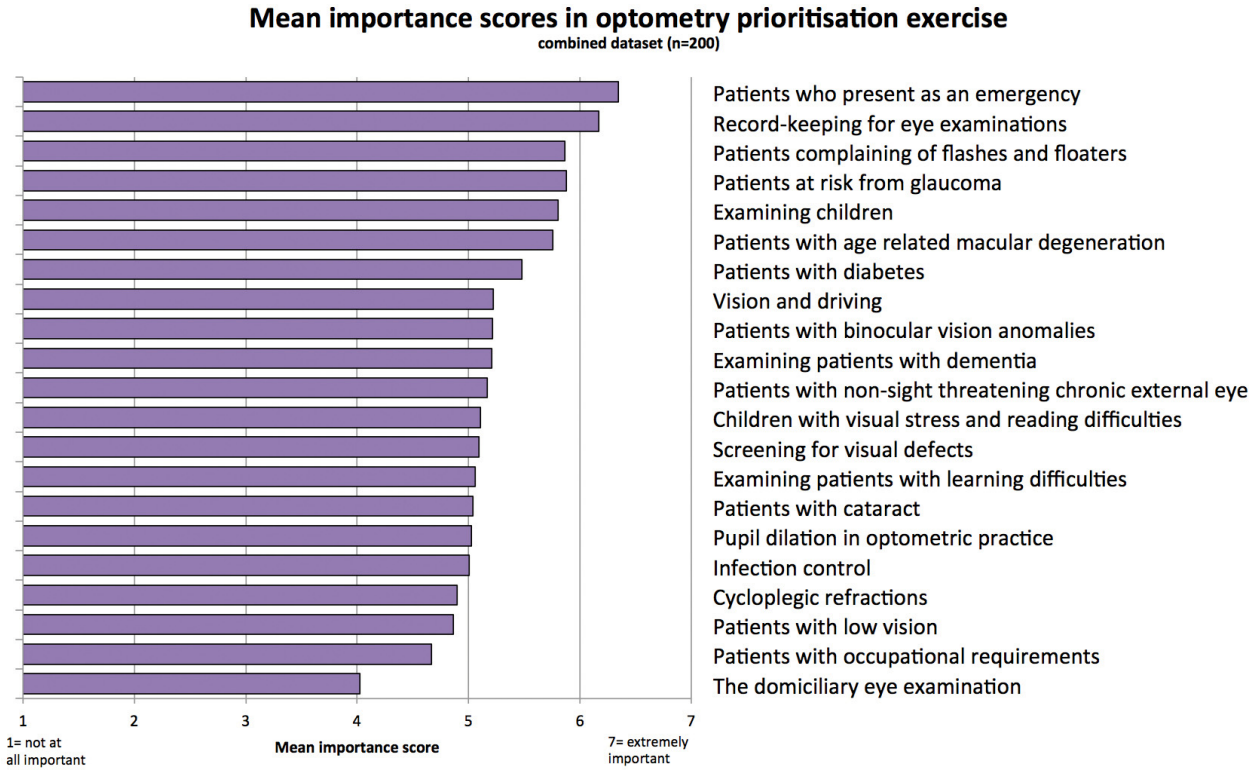

Figure 1. Mean importance scores in combined dataset of prioritisation exercise.

In the second stage, the survey was sent to optometrists registered with the NES Portal. This elicited responses from 184 optometrists. In common with the earlier survey results, the top five topics also achieved mean importance scores of ≥5.8. Four of these were common to both surveys (*patients who present as an emergency; record keeping for eye examinations; patients complaining of flashes and floaters (F&F); patients at risk of glaucoma*) and were taken forward for further for feasibility and impact analysis.

Results from the combined datasets, with topics ranked by mean and median importance scores are presented in *Figures 1* and *2* below. Data were non-normally distributed. The TRiaDS Professional Advisory Group and Implementation Science Group considered all 21 topics and the results of the two surveys. Four topics (that were within the top five rated as most important in the two surveys) were developed further within an adoption matrix, presented in the *Online Appendix* 2. This was informed by detailed discussion of the feasibility and potential impact of the four topics to guide selection of the initial, priority topic for improving community optometry practice in Scotland. Based on this matrix the only topic judged to have both high feasibility and high potential impact was *patients complaining of F&F*. This topic was also considered to be a subset of '*patients who present as an emergency*'.

Systematic search and review of guidance and protocols

MEDLINE, TRIP, Google Scholar, guideline websites and optometric and ophthalmic associations and societies were searched using the terms 'Flashers/Floaters'; 'Posterior Vitreous Detachment' (PVD), 'Retinal Detachment'; 'Vitreoretinal Disease.' A copy of the systematic search strategy and inclusion/exclusion criteria can be found in the *Online Appendix* 3.

Fifty-six documents relating to the management of patients with F&F were identified and are listed in the *Online Appendix* 3. Following the initial screening process, 28 documents were appraised. A flowchart of the search process is provided in the *Online Appendix* 3. A summary of scores for each of the AGREE domains is shown in *Table* 2 below. The results indicate that where recommendations were present (Domain 4) these were poorly supported by evidence (Domain 3) and there was little information on who the target users were (Domain 5) or on stakeholder involvement (Domain 2). Furthermore, several documents instructed readers to 'refer to local protocols if available' thereby undermining the credibility of the document as standalone guidance. Only one document, the NICE (National Institute for Health and Care Excellence) Clinical Knowledge Summary on Retinal Detachment, was

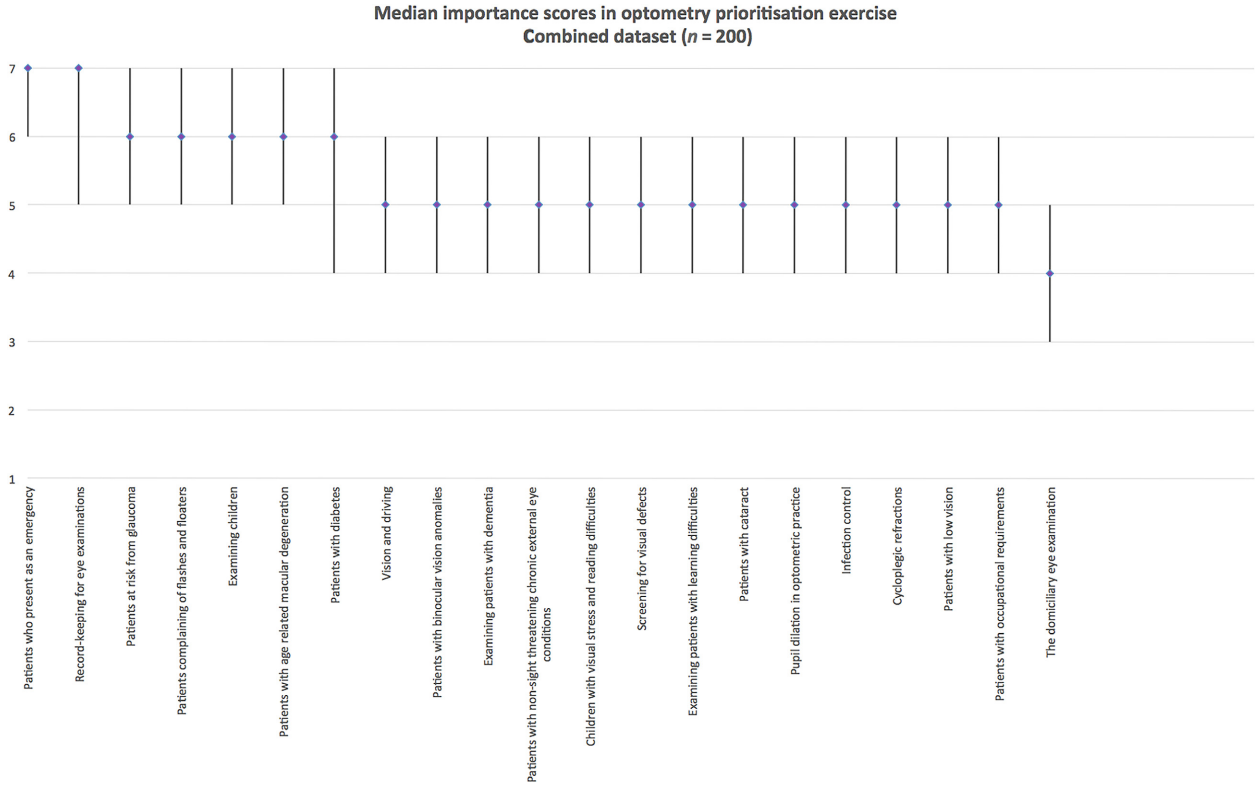

Figure 2. Median importance scores in combined data set of prioritisation exercise.

identified as being of sufficient quality for use but would require modifications before use within community optometry.

Development and execution of a national survey

Analysis of the interviews identified the target behaviour as the management of patients with F&F, i.e. the decision about whether to refer patients with F&F to secondary care or to manage them within practice. Twelve TDF domains containing barriers or facilitators for the target behaviour were taken forward for inclusion in the survey. These domains are presented in *Table* 3 alongside examples of the barriers and facilitators identified by the interviewees. The domains Optimism and Skills were not identified by the interviewees as being barriers or facilitators.

Response rate

An e-mail invitation to take part in the survey was sent to 1081 optometrists. An overall response rate of 31% was achieved (338/1081). Five cases were excluded from the analysis, as they contained no data, leaving a final dataset of 333 cases for analysis.

Demographics

Individual respondent characteristics are presented in *Table* 4. Thirteen of the 14 territorial Health Boards in Scotland were represented (no participants were recruited from NHS Orkney).

Current practice

Results related to current practice are shown in *Table* 5. Patients with F&F were reported as making up 1.7% (S.D. 1.9, range 0–20%) of patients seen in the last 3 months. Although most respondents reported that F&F would be seen the same day, 11% (n = 38) reported not. Overall, about 15% of patients with F&F are reportedly being referred. A small proportion (8.8%, n = 29 of respondents) reported that they had referred 50% or more of their patients that presented with F&F to secondary care.

The barriers and facilitators to managing patients with flashes and floaters

Participants' responses to the domains items were merged into three categories: disagree; neutral; and agree. Items with considerable variation in responses were identified (i.e. where less than 50% of responses fitted within the one response category). Variation was apparent in respondents'

'Beliefs about their Capabilities' of deciding whether or not to refer patients with F&F when their view is restricted (e.g. by cataracts). There was also considerable variation in beliefs about whether the decision to refer or not is accompanied by stress and fear ('Emotion'). Participants also varied in their beliefs about how colleagues and local ophthalmologists felt about referrals ('Social Influences'). Within 'Environmental context and resources', respondents varied in their agreement with whether patient factors such as communication difficulties make the referral decision more difficult. Within the 'Reinforcement' domain considerable variation also existed about whether remuneration

Table 2. Summary table of document scores by AGREE domain

AGREE domain	Number of papers rated below 50	Number of papers rated over 50	Range of scores (possible range 0–100)
Domain 1			
Scope and purpose	20	8	0–94
Domain 2			
Stakeholder involvement	26	2	0–53
Domain 3			
Rigour of development	25	3	0–81
Domain 4			
Clarity of presentation	16	12	0–88
Domain 5			
Applicability	28	0	0–35
Domain 6			
Editorial independence	28	0	0–13

Table 4. Questionnaire respondent characteristics

	Value	*n*
Gender (*N* = 330)		
Male	35%	117
Female	65%	213
Number of years qualified (*N* = 329)		
Median	16	
Mean	17.94	
Range	0–54	
Sessions (0.5 day) per week (*N* = 326)		
Median	9	
Mean	8.2	
Range	1–14	
Practice setting (*N* = 330)		
Independent	50%	164
Small group	10%	33
Large group	35%	116
Locum	5%	17

Table 3. Theoretical domains framework domains containing barriers or facilitators

Associated COM-B component	Theoretical domains framework domain	Barriers and facilitators identified
Psychological capability	Knowledge	Interpretation of patients' F&F symptoms to allow decision about management
		Knowledge of risk factors for retinal detachment
		Knowledge of guidance related to F&F management
	Memory, attention and decision processes	Remembering all the steps needed to carry out when deciding whether or not to refer patient with F&F
	Behavioural regulation	Ways of working including procedures and protocols related to managing patients with F&F
Physical opportunity	Environmental context and resources	Differences across different settings, areas in Scotland etc.
		Availability of resources (including availability of advice from secondary care) to help with management of patients with F&F
Social opportunity	Social influences	Impact of other people (e.g. patients, colleagues, peers, ophthalmologists) on how they manage patients with F&F
Reflective motivation	Professional/social role and identity	Perceptions about role of optometrists in determining management of patients with F&F
	Beliefs about Capabilities	Confidence in own ability to manage patients with F&F
	Beliefs about Consequences	Beliefs about the consequences of referring and not referring patients with F&F
	Intentions	How optometrists intend to act if they are presented with a high/low risk patient with F&F
	Goals	Priority of managing patients with F&F in relation to other tasks
Automatic motivation	Reinforcement	Whether feedback about referrals is provided by secondary care colleagues
	Emotion	Concern, worry about managing patients with F&F

COM-B, capability, opportunity, motivation – behaviour model; F&F, flashes and floaters.

Table 5. Current practice

	Value	*n*
Number of patients seen with F&F in last 3 months (332)		
Median	6	
Mean	10.87	
Range	0–150	
How quickly patients with F&F would be seen (333)		
Same day	89%	295
Following day	8%	26
Within a week	2%	7
Other	1%	5
Estimated F&F referrals to secondary care in last 3 months (333)		
Median	1	
Mean	1.2	
Range	0–10	
Has a protocol for deciding to refer a patient with F&F (332)		
Yes	46%	154
No	49%	163
Don't know	4%	15

F&F, flashes and floaters.

for assessing patients with F&F was adequate and whether they received feedback on their referrals to secondary care. These results are provided in the *Online Appendix* 4.

Patient scenarios

The full results are presented in the *Online Appendix* 5, along with a description of each scenario. The 7-point response scale was collapsed into three categories of response, 'not likely', 'neutral' and 'likely'. There was very little variation in response to Scenario 1 with 97.9% of respondents reporting that they would not refer, which was considered the appropriate decision. There was no variation in responses to Scenario 4 with 100% of respondents reporting that they would refer, which again was considered the appropriate decision. There was however some variation in responses to Scenarios 2, 3 and 5.

To examine the relationship between TDF domains items and the responses to these scenarios, a series of exploratory stepwise multiple regression models were estimated. Grouped domains items with alphas >0.7 and which were significantly correlated with the decision to refer were entered into the regression models. Individual domain items from any significant variables were then entered into a further stepwise regression. The results are presented in *Table* 6. In relation to Scenario 2, the regression results suggest that having a clear plan of the steps that need to be taken once the decision not to refer has been made (within the domain 'Behavioural Regulation'), facilitates an appropriate referral decision. Patients experiencing F&F who think they should be referred to secondary care (domain 'Social Influences'), getting feedback from secondary care about patients that have been referred ('Reinforcement') and a belief that you are likely to be sued if you do not refer a patient with F&F who needs to be seen ('Beliefs about Consequences'), were barriers to appropriate referral. In relation to Scenario 3, patients experiencing F&F who think they should be referred to secondary care ('Beliefs about Consequences') also emerged as a barrier to making the appropriate referral decision as does feeling stressed when deciding whether or not to refer a low risk patient with F&F ('Emotion'). Being confident about deciding whether or not to refer a low risk patient with F&F ('Beliefs about capabilities') was a facilitator to the appropriate referral decision in relation to this patient scenario. There were no significant predictors of participant response to Scenario 5.

Table 6. Patient scenario regression results

	Co-efficient B	S.E.	*p*	CI (95%)
Scenario 2 Appropriate response: don't refer				
Patients experiencing F&F think that I should refer them onto secondary care *(Social Influences)*	0.17	0.07	0.01	0.04 to 0.30
When I refer patients to secondary care I get feedback about diagnosis/treatment *(Reinforcement)*	0.12	0.04	0.01	0.03 to 0.21
If I do not refer a patient with F&F who needs to be seen by secondary care I am likely to be sued *(Beliefs about Consequences)*	0.20	0.07	<0.01	0.09 to 0.31
I have a clear plan of the steps I need to take once I have made the decision not to refer a patient to secondary care *(Behavioural Regulation)*	−0.24	0.61	<0.01	−0.38 to −0.09
Scenario 3 Appropriate response: don't refer				
When I am deciding whether or not to refer a patient with F&F I feel stressed (LOW RISK PATIENT) *(Emotion)*	0.14	0.05	<0.01	0.04 to 0.25
Patients experiencing F&F think that I should refer them onto secondary care *(Social Influences)*	0.17	0.07	0.02	0.03 to 0.30
I am confident I can decide whether or not to refer a patient with F&F (LOW RISK PATIENT) *(Beliefs about Capabilities)*	−0.2	0.08	0.02	−0.36 to −0.03

F&F, flashes and floaters, text in italics denotes the Theoretical Domains Framework domain a particular item is categorised under.

Identifying options for practice improvement interventions

The regression analysis of the scenario responses identified six TDF domains to be salient in relation to the target behaviour (management of patients with F&F) – 'social influences', 'emotion', 'beliefs about capabilities', 'beliefs about consequences', 'behavioural regulation' and 'reinforcement'. Hence, these are potential targets for future interventions to improve practice. These six domains were mapped onto 'intervention functions' and then onto 'behaviour change techniques' of the Behaviour Change Wheel framework using published matrices. The results of this are illustrated in the *Online Appendix* 6.

Discussion

This paper presents the methods and results of a four-stage process, namely, a topic prioritisation exercise, a systematic search and review of guidance and protocols, a national survey, and finally, the identification of options for practice improvement intervention.

The topic prioritisation exercise identified 'the management of patients complaining of 'flashes and floaters' as the priority topic to take forward. In most cases, patients experiencing F&F present at their local optometry practice. F&F are common symptoms and it is crucial that a thorough history is taken and a careful ocular and retinal examination is conducted to exclude the possibility of a retinal tear or detachment.[24] Patients presenting with F&F must receive appropriate management. Evidence suggests that the early detection of a retinal tear or detachment and prompt treatment will improve the patient's visual prognosis[25,26] and so the optometrist will need to make an urgent referral when this sight threatening diagnosis has been made or strongly suspected. However, this is a challenging area for community optometrists because in the majority of cases[27] F&F do not pertain to any sight threatening condition and as a result there is a need to ensure that decision making around referral to secondary care is managed in such a way as to avoid unnecessary patient worry, unnecessary variation in practice and overburdening of NHS resources.[28]

The systematic search and review highlighted scarce evidence of appropriate guidance for optometrists in this area, with only the NICE Clinical Knowledge Summary on Retinal Detachment being identified as being potentially of sufficient quality for use, but with a requirement for modifications. Following strong recommendations from the Royal College of Ophthalmologists and The College of Optometrists, the NICE Clinical Knowledge Summary on Retinal Detachment was amended in March 2015. This guidance now provides clear advice that any practitioners who are competent in the use of slit lamp examination and indirect ophthalmoscopy can examine patients who present with new onset flashes and/or floaters without visual loss. Prior to this, the guidance could have been interpreted to mean that any patient who presented with recent onset flashes and/or floaters should be referred to an ophthalmologist within 24 h, even if the patient's examination was normal on dilated slit lamp indirect ophthalmoscopy and the patient had no other signs of retinal detachment. This amended version clarifies that it is the competence of the examining practitioner that is important rather than their professional designation. This reduces the burden to refer patients unnecessarily where a practitioner is confident that there is no retinal tear or detachment.

There are some limitations to this study to consider. The survey adds to the limited literature available about the management of patients with flashes and floaters and current practice, however, the relatively low response rate does potentially introduce bias and results should be interpreted with this in mind. The prioritisation process resulted in a number of topics very closely rated for importance. We chose to rank the mean importance ratings of topics identified by stakeholders and consider the feasibility and impact of the top four topics from both stakeholder surveys in the first instance to identify our initial topic for research. Other methods of prioritisation such as using medians and interquartile ranges are possible and may be useful for non-normally distributed data. Examination of routine data relating to eye healthcare is another approach that could be used to identify areas where there is scope for improvement. The routinely collected eye health data is currently very limited in Scotland and in the rest of the UK, which meant this was not a feasible approach. Such an approach is currently being developed and may prove useful for the future. The scope of this project meant that only one topic could be chosen to take forward in the first instance and careful consideration was given to ensure the topic chosen was likely to produce feasible and impactful research. This does not mean that further topics do not warrant research and indeed our research group is interested in pursuing further topics that were identified as priorities. Finally, our research group were tasked with identifying the service-driven priorities for practice improvement but there is also a clear need to consult with patients to identify their priorities for improving services.

Regression analysis in relation to the patient scenario data revealed the domains of 'reinforcement', 'beliefs about consequences', 'social influences', 'behavioural regulation', 'beliefs about capabilities' and 'emotion' to be driving optometrists' decisions about referral. These domains suggest a number of intervention functions through which future interventions could be successful in changing optometrists' behaviour when managing patients presenting with F&F. For example, one future intervention could tackle 'beliefs about capabilities' by enhancing confidence

when deciding whether or not to refer patients with F&F to secondary care. This could be through 'education', by increasing knowledge and/or skills with courses for continuing professional development or through 'modelling' by providing optometrists with an observable example to imitate such as video presentation of simulated patient-optometrist consultations. The perception that patients experiencing flashes and floaters expect to be referred could also be targeted through simulated patient consultations alongside pointers for how to navigate these types of conversations with patients. The results suggest that optometrists were less likely to make an inappropriate referral if they had a clear plan about the steps to take when they were *not* going to refer a patient to secondary care. Providing optometrists with guidance about what to do when not referring a patient (for example, outlining what to say to the patient including providing written information about when they should be re-examined and what circumstances should lead them to seek urgent care) could be trialled to see whether this assists with referral management. Future work is planned to refine and test a theory-based behaviour change intervention to improve optometrists' referral practice.

Conclusions

Few studies have been conducted in the UK to assess the management of patients with flashes and floaters and little is known about current practice. This study has gone some way towards gathering this information and towards identifying the most salient targets for future interventions to improve practice and what form these interventions may take.

This study has demonstrated the use of a flexible theory-informed approach that can be used to engage with stakeholders and health professionals and to address service driven implementation priorities in other healthcare settings.

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References

1. NHS (GOS) Scotland, 2006, http://www.legislation.gov.uk/ssi/2006/135/contents/made, accessed 15/May/2018.
2. Suttle CM, Jalbert I & Alnahedh T. Examining the evidence base used by optometrists in Australia and New Zealand. *Clin Exp Optom* 2012; 95: 28–36.
3. Parkins DJCR, Pooley JE & Ryan B. The developing role of optometrists as part of the NHS primary care team. *Optom Pract* 2014; 15: 177–184.
4. General Optical Council. *Annual report 2014-15*. London, 2015.
5. Seddon M, Marshall M, Campbell S & Roland M. Systematic review of studies of quality of clinical care in general practice in the UK, Australia and New Zealand. *Qual Health Care* 2001; 10: 152–158.
6. Grimshaw JM, Eccles MP, Lavis JN, Hill SJ & Squires JE. Knowledge translation of research findings. *Implement Sci* 2012; 7: 1.
7. Clarkson JE, Ramsay CR, Eccles MP *et al.* The translation research in a dental setting (TRiaDS) programme protocol. *Implement Sci* 2010; 5: 1.
8. *Translation research in a dental setting (TRiaDS)*, http://www.triads.org.uk/, accessed 15/May/2018.
9. *The healthcare quality strategy for NHS Scotland*. The Scottish Government: Edinburgh, Scotland, 2010.
10. Michie S, van Stralen MM & West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* 2011; 6: 1.
11. Templeton AR, Young L, Bish A *et al.* Patient-, organization-, and system-level barriers and facilitators to preventive oral health care: a convergent mixed-methods study in primary dental care. *Implement Sci* 2016; 11: 1.
12. O'Connell S, Jackson B, Edwardson CL *et al.* Providing NHS staff with height-adjustable workstations and behaviour change strategies to reduce workplace sitting time: protocol for the Stand More AT (SMArT) Work cluster randomised controlled trial. *BMC Public Health* 2015; 15: 1.
13. Cane J, O'Connor D & Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci* 2012; 7: 1.
14. Michie S, Johnston M, Abraham C, Lawton R, Parker D & Walker A. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care* 2005; 14: 26–33.
15. Lavis JN, Permanand G, Oxman AD, Lewin S & Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP) 13: preparing and using policy briefs to support

evidence-informed policymaking. *Health Res Policy Syst* 2009; 7: 1.
16. Defechereux T, Paolucci F, Mirelman A *et al.* Health care priority setting in Norway a multicriteria decision analysis. *BMC Health Serv Res* 2012; 12: 1.
17. Bower C. *Guide and Template for Comprehensive Health Improvement Planning*. Hartford, Connecticut: Department of Health, Planning and Workforce Development Section, 2009.
18. Campbell S. *Knowledge Translation Curriculum*. Canadian Coalition for Global Health Research: Ottawa, 2012.
19. Brouwers MC, Kho ME, Browman GP *et al.* AGREE II: advancing guideline development, reporting and evaluation in health care. *CMAJ* 2010; 182: E839–E842.
20. *NHS education for Scotland portal*, http://www.nes.scot.nhs.uk/education-and-training/the-nes-portal.aspx, accessed 15/May/2018.
21. Michie S, Atkins L & West R. *The Behaviour Change Wheel: A Guide to Designing Interventions*. Silverback Publishing: UK, 2014.
22. Hsieh H-F & Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005; 15: 1277–1288.
23. Ritchie J & Spencer L. Qualitative data analysis for applied policy research. *Qual Res Companion* 2002; 573: 305–329.
24. Turner G. *Management of Acute Retinal Detachment, Ophthalmic Services Guidance*. The Royal College of Ophthalmologists: London, 2010.
25. Minihan M, Tanner V & Williamson TH. Primary rhegmatogenous retinal detachment: 20 years of change. *Br J Ophthalmol* 2001; 85: 546–548.
26. Kang HK & Luff AJ. Management of retinal detachment: a guide for non-ophthalmologists. *BMJ* 2008; 336: 1235–1240.
27. Alwitry A, Chen H & Wigfall S. Optometrists' examination and referral practices for patients presenting with flashes and floaters. *Ophthalmic Physiol Opt* 2002; 22: 183–188.
28. *Chief Medical Officer's annual report 2014-15*. Edinburgh, Scotland: The Scottish Government, 2016.

Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix 1. Figure 1 – study diagram
Appendix 2. Topic prioritisation
Appendix 3. Systematic search strategy
Appendix 4. Variation in views about barriers and facilitators
Appendix 5. Patient scenarios
Appendix 6. Identifying intervention options for practice improvement